

What is claimed is:

1. A method for etching a semiconductor substrate by immersing the semiconductor substrate in etching solution, the method comprising:

immersing a silicon substrate, which is the semiconductor substrate, in potassium hydroxide solution, which is the etching solution;

anodizing a main surface of the silicon substrate, which is immersed in the potassium hydroxide solution, by applying an electrical potential to the silicon substrate while the silicon substrate is used as an anode, so that an oxide film is formed in the main surface of the silicon substrate; and

etching a main surface side of the silicon substrate in the potassium hydroxide solution.

2. The method according to claim 1, wherein the etching of the main surface side of the silicon substrate includes etching of the main surface side of the silicon substrate without applying the electrical potential to the silicon substrate upon initiation of the etching of the main surface side of the silicon substrate.

3. The method according to claim 1, wherein the etching of the main surface side of the silicon substrate includes etching of the main surface side of the silicon substrate while applying the electrical potential, which causes formation of the oxide film, to the silicon substrate.

4. The method according to claim 1, wherein the etching of the main surface side of the silicon substrate includes maintaining a KOH concentration of the potassium hydroxide solution in a range of 39-48 weight percent and also maintaining the solution temperature of the potassium hydroxide solution in a range of 90-140 degrees Celsius.

5. The method according to claim 1, wherein the main surface of the silicon substrate has a (110) surface.